

**WHAT IS CLAIMED IS:**

1           1.       A system for interconnecting wired and wireless phone services, comprising:  
2                   at least one of first wired terminals;  
3                   public and private mobile communication terminals being registered in public and private  
4                   mobile communication networks;  
5                   a private base station constructing a wireless communication path with an arbitrary mobile  
6                   communication terminal in a service area of said private base station and manages wireless resources  
7                   for the mobile communication; and  
8                   a wired and wireless interconnecting apparatus being connected to a public phone network  
9                   and said private base station, constructing an internal network formed of said first wired terminals  
10                  and said public and private mobile communication terminals to endow each terminal with a wired  
11                  phone number, making a call to a wired terminal when there is a call to an arbitrary first wired  
12                  terminal, and performing a switching function to simultaneously make a call to said public and  
13                  private mobile communication terminal assigned to said first wired terminal.

1           2.       The system according to claim 1, wherein said wired and wireless interconnecting  
2                   apparatus comprising:  
3                   a wired exchange endowing each extension subscriber with a wired phone number, being  
4                   connected to a public phone network, and providing the extension subscriber with a wired phone  
5                   network service, said first wired terminals and said public and private mobile communication

terminals being the extension subscribers;

a mobile gateway performing an exchange of the extension between said first wired terminals and said public and private mobile communication terminals through the wired and wireless communication network correspondingly to the wired phone number endowed from the wired exchange, and making a call to the corresponding wired terminal when an arbitrary wired phone number is called and makes a call to the assigned corresponding private and mobile communication terminal when an arbitrary private and mobile communication terminal is assigned to the corresponding wired phone number; and

a private base station controller connecting said mobile gateway to said private base station and connecting said base station to a base station controller of the public mobile communication network.

3. The system according to claim 2, wherein, said wired exchange comprising a database including the wired phone number with which each extension subscriber is endowed.

4. The system according to claim 2, wherein, said mobile gateway including a database determining whether a multiple terminating function is established with respect to an arbitrary wired phone number and includes a wired phone number of the public and private mobile communication terminal which is called by the multiple terminating function.

5. The system according to claim 2, wherein, said private base station controller

including a database including the wired phone number of the public and private mobile communication terminal and a mobile identifier number with which the public and private mobile communication terminal is endowed from the public mobile communication network.

6. The system according to claim 1, wherein the wired and wireless interconnecting apparatus comprising:

a mobile gateway endowing each extension subscriber with the wired phone number and performs an exchange of the extension between said first wired terminals and said public and private mobile communication terminals through the wired and wireless communication network correspondingly to the wired phone number, and making a call to the corresponding wired terminal when an arbitrary wired phone number is called, and making a call to an assigned private and mobile communication terminal when the arbitrary private and mobile communication terminal is assigned to the corresponding wired phone number, and performs a Tandem switching function when terminals except the first extension subscriber being connected to the public phone network, the first wired terminals and public and private mobile communication terminals being the first subscriber;

a wired exchange providing the wired phone service by endowing at least one of second wired terminal with the wired phone number, and processes the Tandem call which is received from the mobile gateway; and

a private base station controller connecting said mobile gateway to said private base station and said private base station to said base station controller of the public mobile communication network.

1           7.     The system according to claim 6, wherein said mobile gateway comprises a database  
2 including the wired phone number, identification information indicating whether the wired phone  
3 number is a wired phone number connected to a terminal or a wired phone number not connected  
4 to a terminal, identification information indicating whether the wired phone number uses the  
5 multiple terminating service, and a wired phone number of the public and private mobile  
6 communication terminal which is called by the multiple terminating function.

1           8.     The system according to claim 6, wherein said wired exchange includes a database  
2 including a wired phone number with which said second wired terminal is endowed.

1           9.     The system according to claim 6, wherein said private base station controller  
2 including a database which includes the wired phone number of said public and private mobile  
3 communication terminal, and a mobile identifier number with which the public and private mobile  
4 communication terminal is endowed from the public mobile communication network.

1           10.    The system according to claim 1, wherein said wired and wireless interconnecting  
2 apparatus comprising:

3               a group exchange endowing each extension subscriber with a wired phone number by making  
4 said first wired terminals and said public and private mobile communication terminals as a first  
5 extension subscriber, performing an exchange of the extension between said first wired terminals

6 and said public and private mobile communication terminals through said wired and wireless  
7 communication network correspondingly to the wired phone number, making a call to the  
8 corresponding wired terminal when an arbitrary wired phone number is called, making a call to the  
9 assigned private and mobile communication terminal when an arbitrary public and mobile  
10 communication terminal is assigned to the corresponding wired phone number, and providing a  
11 wired phone service by endowing at least one of said second wired terminal with the wired phone  
12 number; and

13 a private base station controller connecting the group exchange to said private base station  
14 and said private base station to said base station controller of the public mobile communication  
15 network.

1 11. The system according to claim 10, wherein said group exchange comprises  
2 a database which a wired phone number, identification information indicating whether the  
3 wired phone number is a wired phone number connected to a terminal or a wired phone number not  
4 connected to a terminal, identification information indicating whether the wired phone number uses  
5 the multiple terminating service, a wired phone number of the public and private mobile  
6 communication terminal which is called by the multiple terminating function, and a wired phone  
7 number with which the second wired terminal is endowed.

1 12. The system according to claim 10, wherein, said private base station controller  
2 comprises a database which includes a wired phone number of the public and private mobile.

3 communication terminal and a mobile identifier number with which the public and private mobile  
4 communication terminal is endowed from the public mobile communication network.

1 13. A method for processing a call in a system for interconnecting wired and wireless  
2 phone services comprising at least one of first wired terminals, public and private mobile  
3 communication terminals registered in public mobile communication network and private mobile  
4 communication network, a private base station to perform a wireless communication with the public  
5 and private mobile communication terminal, a wired and wireless interconnecting apparatus to  
6 perform an interconnection between the first wired terminals and the public and private mobile  
7 communication terminal through the private base station, the method comprising:

8 enabling said wired and wireless interconnecting apparatus to make a call to the wired  
9 terminal when an arbitrary first wired terminal is called, and to be switched in order to make a call  
10 to said public and private mobile communication terminals assigned to the wired terminals  
11 simultaneously;

12 enabling said private base station to be broadcasted in its wireless area in order to make a call  
13 to the corresponding public and private mobile communication terminal according to the switching  
14 of said wired and wireless interconnecting apparatus; and

15 enabling said wired and wireless interconnecting apparatus to make a call to a responding  
16 terminal among the called first wired terminal or the public and private mobile communication  
17 terminals and to stop the call made to the terminal which does not make a response.

1           14.     The method according to claim 13, wherein the switching step comprising:  
2           searching for a first database and determining whether the called phone number is said first  
3     wired terminal;  
4           searching for a second database and determining whether the corresponding phone number  
5     is established for a multiple terminating function, when the called phone number is said first wired  
6     terminal as a result of the determination;  
7           making a call to said first wired terminal, searching for a third database, and obtaining  
8     information to make a call to the corresponding public and private mobile communication terminal,  
9     when the multiple terminating function is established as a result of the determination; and  
10          requesting a call of the corresponding public and private mobile communication terminal to  
11     said private base station using the information obtained in said third database.

1           15. An apparatus, comprising:  
2           an interconnecting unit being connected to a public network and a private base station,  
3     constructing an internal network formed of a plurality of first wired terminals and a plurality of  
4     public and private mobile communication terminals to endow each terminal with a wired phone  
5     number, making a call to a wired terminal when there is a call to an arbitrary first wired terminal,  
6     and performing a switching function to simultaneously make a call to said public and private mobile  
7     communication terminal assigned to said first wired terminal, said private base station constructing  
8     a wireless communication path with an arbitrary mobile communication terminal in a service area  
9     of said private base station and manages wireless resources for the mobile communication, said

10 public and private mobile communication terminals being registered in public and private mobile  
11 communication networks.

1 16. The apparatus of claim 15, further comprised of said interconnecting unit storing  
2 information for a phone number with which the interconnecting unit has endowed for a  
3 corresponding subscriber and a phone number which is endowed by a mobile communication service  
4 provider.

1 17. The apparatus of claim 15, further comprising of a subscriber being endowed with an  
2 arbitrary wired phone number from said interconnecting unit and using a wired phone service by  
3 connecting one of the first wired terminals to the public network, and also using the mobile  
4 communication service using the first wired terminal, accordingly the subscriber being endowed with  
5 at least three phone numbers, a first phone number being a wired phone number which is endowed  
6 in the first wired terminal, a second number being a phone number which is endowed for the said  
7 public and private mobile communication terminal in the public mobile communication network,  
8 and a third number being a virtual phone number which is endowed to said public and private mobile  
9 communication terminal in said interconnecting unit, said interconnecting unit storing information  
10 of the three phone numbers for the corresponding subscriber in a first database.

1 18. The apparatus of claim 17, with said first database storing information indicating whether  
2 each phone number is a virtual phone number, and information indicating whether each phone



number is registered in multiple terminating services, said multiple terminating service being a service in which a ring signal is transferred to said first wired phone service terminal and public and said private mobile communication terminal simultaneously.

19. The apparatus of claim 15, with said interconnecting unit further comprising of:

a private base station controller performing a mobile link control and a hand off, controlling said private base station to perform a call process of the subscriber for supporting public mobile communication network and private mobile communication network services and an analysis of supplementary services, when receiving the private mobile communication service, said public and private mobile communication terminal subscriber adding a predetermined identification information to the outgoing phone number in order to discriminate the services, said private base station controller discriminating whether the outgoing call requires a public mobile communication service or a private mobile communication service using the identification information.

20. The apparatus of claim 19, with said interconnecting unit further comprising of:

a mobile gateway connected to said private base station controller, said mobile gateway including a first database with respect to the wired phone number endowed by a wired exchange, the first database storing information indicating whether each phone number is a virtual phone number, and information indicating whether each phone number is registered in the multiple terminating services, said multiple terminating service being a service in which a ring signal is transferred to said first wired phone service terminal and public and said private mobile communication terminal

8 simultaneously, said private base station controller processing interfaces for interconnecting to said  
9 mobile gateway.

1 21. The apparatus of claim 20, with said interconnecting unit further comprising of:  
2 said wired exchange being connected to said mobile gateway, being an exchanging system  
3 for providing the wired phone network with a service, assigning a wired phone number with respect  
4 to an arbitrary subscriber for the wired phone service.

1 22. The apparatus of claim 21, with said wired exchange being assigned a wired phone  
2 number to each subscriber within the certain range as said wired exchange provides its extension  
3 subscriber with the wired phone service.

1 23. The apparatus of claim 22, with said wired exchange comprising a database including the  
2 wired phone number with which each extension subscriber is endowed, the wired phone number  
3 having an end being connected to the wired terminal, and said virtual phone number whose end is  
4 not connected to the wired terminal and in which only the virtual phone number is assigned.

1 24. The apparatus of claim 19, with said interconnecting unit further comprising of:  
2 a group exchange being a system performing a call process of the wired phone network and  
3 mobile communication services for wired and wireless subscribers in a mobile zone, and providing  
4 subscribers outside the mobile zone with a wired phone service, said private base station controller

5 connecting said group exchange to said private base station, and being connected to said base station  
6 controller of said public mobile communication network for a general public mobile communication  
7 service.

1 25. The apparatus of claim 24, further comprised of when said group exchange assigns the  
2 wired phone number to an arbitrary subscriber for the wired phone service, an interface to which the  
3 wired phone number is assigned is directly connected to the wired phone terminal of the subscriber  
4 through a telephone line, as said group exchange provides its extension subscriber with the wired  
5 phone service, the wired phone number is assigned to each subscriber, the wired phone number being  
6 a general phone number being connected to the wired phone terminal in its end, and the virtual wired  
7 phone number not being connected to said wired phone terminal and being assigned only the virtual  
8 phone number.

1 26. The apparatus of claim 19, with said interconnecting unit further comprising of:  
2 a group exchange being connected to said private base station controller and performing a  
3 function to interconnect a mobile communication service of said private base station controller.

1 27. The apparatus of claim 26, with said group exchange comprising a database for the wired  
2 phone number, the database storing information indicating whether each phone number is a virtual  
3 phone number, and whether each phone number has been registered in the multiple terminating  
4 service.

1           28. A computer-readable medium having computer-executable instructions for performing  
2 a method of processing a call in a system for interconnecting wired and wireless phone services ,  
3 comprising:

4           enabling a wired and wireless interconnecting apparatus to make a call to a wired terminal  
5 when an arbitrary first wired terminal is called, and to be switched in order to make a call to public  
6 and private mobile communication terminals assigned to the wired terminals simultaneously;

7           enabling a private base station to be broadcasted in its wireless area in order to make a call  
8 to the corresponding public and private mobile communication terminal according to the switching  
9 of said wired and wireless interconnecting apparatus; and

10          enabling said wired and wireless interconnecting apparatus to make a call to a responding  
11 terminal among the called first wired terminal or the public and private mobile communication  
12 terminals and to stop the call made to the terminal which does not make a response.

1           29. A computer-readable medium having computer-executable instructions for performing  
2 a method of claim 28, wherein the switching step comprising:

3           searching for a first database and determining whether the called phone number is said first  
4 wired terminal.

1           30. A computer-readable medium having computer-executable instructions for performing  
2 a method of claim 29, wherein the switching step further comprising:

3 searching for a second database and determining whether the corresponding phone number  
4 is established for a multiple terminating function, when the called phone number is said first wired  
5 terminal as a result of the determination.

1 31. A computer-readable medium having computer-executable instructions for performing  
2 a method of claim 30, wherein the switching step further comprising:

3 making a call to said first wired terminal, searching for a third database, and obtaining  
4 information to make a call to the corresponding public and private mobile communication terminal,  
5 when the multiple terminating function is established as a result of the determination.

1 32. A computer-readable medium having computer-executable instructions for performing  
2 a method of claim 31, wherein the switching step comprising:

3 requesting a call of the corresponding public and private mobile communication terminal to  
4 said private base station using the information obtained in said third database.

1 33. A computer-readable medium having stored thereon a data structure comprising:  
2 a first field containing data representing enabling a wired and wireless interconnecting  
3 apparatus to make a call to a wired terminal when an arbitrary first wired terminal is called, and to  
4 be switched in order to make a call to public and private mobile communication terminals assigned  
5 to the wired terminals simultaneously, said wired and wireless interconnecting apparatus being in  
6 a system for interconnecting wired and wireless phone services comprising at least one of first wired

7 terminals, public and private mobile communication terminals registered in public mobile  
8 communication network and private mobile communication network, a private base station to  
9 perform a wireless communication with the public and private mobile communication terminal, and  
10 said wired and wireless interconnecting apparatus to perform an interconnection between the first  
11 wired terminals and the public and private mobile communication terminal through the private base  
12 station;

13 a second field containing data representing enabling a private base station to be broadcasted  
14 in its wireless area in order to make a call to the corresponding public and private mobile  
15 communication terminal according to the switching of said wired and wireless interconnecting  
16 apparatus; and

17 a third field containing data representing enabling said wired and wireless interconnecting  
18 apparatus to make a call to a responding terminal among the called first wired terminal or the public  
19 and private mobile communication terminals and to stop the call made to the terminal which does  
20 not make a response.